Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) Method for the detection in a given DNA sequence of DNA mutations, single nucleotide polymorphisms, and insertions and deletions comprising the steps of:

a) producing replicate(s) with an engineered polymerase of said given DNA sequence with at lest 50% of one of the four natural DNA bases exchanged against a not natural base;

b) using said not natural base to cleave the replicate(s) obtained in step a) and to produce a DNA product presenting sequence-specific fragments;

c) analyzing said sequence-specific fragments obtained in step b) by mass spectrometry to get sequence-specific fragment patterns; and

d) using the sequence-specific fragment patterns obtained in step c) to identify sequence changes relative to a reference to said given DNA sequence.

2. (Original) Method according to claim 1 wherein the not natural base in step a) is selected from the group consisting of an RNA base (ATP, GTP, CTP, or UTP), a phosphorothioate base, a phosphoroselenoate base, a photochemically cleavage inducible base.

3. (Currently amended) Method according to claim 1 ~~and 2~~ wherein in the replicate more than 70% of one of the four natural DNA bases is exchanged against a not natural base.

4. (Currently amended) Method according to claim ~~3~~ 1 wherein in the replicate 100% of one of the four natural DNA bases is exchanged against a not natural base.

5. (Original) Method according to claim 2 wherein the RNA base is cleaved in step b) by treatment with alkali and incubation at elevated temperature.

6. (Original) Method according to claim 2 in which the phosphorothioate or phosphoroselenoate base is cleaved in step b) by condensation of a compound of the nature OH-(CH2)n-I, where n=2-5, and incubation at elevated temperature.

7. (Original) Method according to claim 2 in which a photochemically cleavage inducible base is cleaved in step b) by exposure to light.

8. (Original) Method according to claim 1 wherein the step a) of producing replicate(s) is carried out with a procedure selected from the group consisting of the polymerase chain reaction OPCR) and the linear DNA copying procedure.

9. (Original) Method according to claim 8 wherein the linear copying procedure is a rolling circle replication.

10. (Currently amended) Method according to claim 1 comprising further a step a') between step a) and step b), wherein in step a') the replicate(s) is/are purified ~~for example on reversed phase material or with ion exchange resins~~.

11. (Currently amended) Method according to claim 1 comprising further a step b') between step b) and step c), wherein in step b') the sequence-specific fragments are purified ~~for example on reversed phase material or with ion exchange resins~~.

12. (Currently amended) Method according to claim 1 wherein the mass spectrometer used for step c) is selected from the group comprising a MALDI ~~or~~ and an ESI mass ~~spectrometer~~ spectrometers.

13. (Original) Kit for the detection in a given DNA sequence of DNA mutations, single nucleotide polymorphisms, and insertions and deletions for implementing a method according to claim 1 comprising:

- An engineered DNA polymerase,
- A set of non-natural bases and dNTPs,

- A buffer.

14. (New) Method according to claim 10, wherein the replicate(s) is/are purified on reversed phase material.

15. (New) Method according to claim 10, wherein the replicate(s) is /are purfied with ion exchange resins.

16. (New) Method according to claim 11, wherein the sequence-specific fragments are purified on reserved phase material.

17. (New) Method according to claim 11, wherein the sequence-specific fragments are purified with ion exchange resins.